

REMARKS/ARGUMENTS

Claims 1-10 and new Claims 11-13 are active in the case. Reconsideration is respectfully requested.

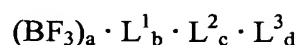
The present invention relates to a process for preparing low-odor addition polymers from acrylic acid monomer.

Claim Amendments

Claims 1-10 have been amended to make minor changes thereto, none of which change the scope of the embodiments of the invention as claimed. New Claims 11-13 find support at page 4, lines 37-39 and page 5, lines 4-9 of the text. Accordingly, the new claims do not introduce new matter into the case. Entry of the amendments is respectfully requested.

Invention

The present invention is directed to a process for preparing polyisobutene that has a content of terminal vinylidene groups of at least 75 mol % by polymerizing isobutene or isobutenic hydrocarbon mixtures in the liquid phase in the presence of a boron trifluoride complex catalyst of the composition



wherein  $\text{L}^1$  is water, a primary  $\text{C}_1$ - $\text{C}_5$ -alkanol and/or a secondary  $\text{C}_3$ - $\text{C}_5$ -alkanol,  $\text{L}^2$  is at least one aldehyde and/or one ketone, and  $\text{L}^3$  is an ether having at least 5 carbon atoms, a secondary alkanol having at least 6 carbon atoms, a primary alkanol having at least 6 carbon atoms and/or a tertiary alkanol, and wherein the b:a ratio is in the range from 0.9 to 3.0, the c:a ratio is in the range from 0.01 to less than 0.5 and the d:a ratio is in the range from 0 to 1.0.

Claim Rejection, 35 USC 103

Claims 1-5 and 10 stand rejected based on 35 USC 103(a) as obvious over Rath, U. S. Patent 5,286,823 in view of Research disclosure 424060. This ground of rejection is respectfully traversed.

The present invention and the cited prior art relate to the same technical field of preparing polyisobutene, the molecules of which are characterized by a high content of terminal vinylidene double bonds to the extent of at least 75 mol %. The reaction is conducted in the liquid phase in the presence of a complex catalyst of  $\text{BF}_3$ . Specifically, in the present invention as stated on page 2 of the specification, the objective sought after and achieved is the preparation of polyisobutene, whose molecules are characterized by a high content of terminal vinylidene double bonds, that are of a lower molecular weight as produced by the presence of a given amount of  $\text{BF}_3$  complex catalyst or that the amount of catalyst can be reduced in the production of a polyisobutene product of a given molecular weight. The fact that applicants have achieved this objective is clear from the data in the table on page 7 of the specification which demonstrates that as the amounts of ketone (acetone), methanol and 2-ethylhexanol are varied within the ratio ranges stated in the present claims, while achieving and maintaining a high terminal vinylidene content of the product polyisobutene, the amount of  $\text{BF}_3$  required to achieve the desired objective can be materially reduced.

As stated above, while the Rath et al patent is in the same technical field of the present invention in describing the polymerization of isobutene monomer to polyisobutene having a high terminal vinylidene content in the presence of a  $\text{BF}_3$  complex catalyst, the reference does not teach or suggest that by preparing a complex  $\text{BF}_3$  catalyst having certain types and amounts of organocomplexing agents, the appropriate reaction conditions are thereby formed which achieve the production of polyisobutene having a high terminal

vinylidene group content while advantageously attaining this result with lesser amounts of  $\text{BF}_3$  complex catalyst. In fact, the Rath patent discloses a  $\text{BF}_3$  complex that is formed by reacting  $\text{BF}_3$  with a combination of a sec-alcohol of 3 to 20 carbon atoms and a simple hydrocarbyl ether. There is no teaching or suggestion of the  $\text{BF}_3$  catalyst as defined in the present claims in the patent. The complexing agent of the catalyst of the patent is a sec-alcohol alone or in combination with an ether. (Several examples of the patent describe catalysts that are prepared by reacting  $\text{BF}_3$  with 2-butanol or isopropanol.) Clearly, the Rath patent does not teach the  $\text{BF}_3$  complex catalyst of the present invention.

Applicants submit that the Research Disclosure document does not improve upon the deficiencies of the Rath patent with regard to the present invention. The document, although within the same technical field as the present invention and Rath, nevertheless discloses a  $\text{BF}_3$  based catalyst for the polymerization of isobutene to polyisobutene containing terminal vinylidene units that is complexed with either a cyclic hydrocarbyl ketone or an alkyl aldehyde or alkyl ketone. (The Examiner states on page 4 of the Office Action that since the upper endpoint of the range of the c:a ratio of the present catalyst is 0.5, the catalyst of the reference is considered to overlap with the present catalyst at this upper endpoint limit. However, applicants have now amended Claim 1 to recite an upper c:a ratio limit of less than 0.5. Accordingly, overlap in the scope of the catalyst of the reference with the present catalyst is avoided.) The objective of the DR document apparently is to provide a catalyst system that achieves the production of polyisobutene having a high terminal vinylidene group content with no teaching or suggestion of the objective of the present invention of producing polyisobutene having a high content of terminal vinylidene units, but with a significantly reduced amount of complex  $\text{BF}_3$  catalyst. Accordingly, applicants maintain that one of skill in the art is not provided with any motivation by the RD document to modify the catalyst described in the Rath patent by still further adding yet another organic compound, i.e., a

ketone or aldehyde, as a complexing agent to  $\text{BF}_3$  for the preparation of a modified catalyst to achieve an objective that is neither taught nor suggested by either reference. Withdrawal of the obviousness ground of rejection is respectfully requested.

The Examiner is thanked for the indication of allowable subject matter in the case.

It is now believed that the application is in proper condition for allowance. Early notice to this effect is earnestly solicited.


Respectfully submitted,

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